US009434122B2

(12) **United States Patent**
Hsu

(10) **Patent No.: US 9,434,122 B2**
(45) **Date of Patent: Sep. 6, 2016**

(54) **PACKAGING BAG LINE-FOLDING AND SEALING MACHINE**

(71) Applicant: **CHAN LI MACHINERY CO., LTD.**, Taoyuan (TW)

(72) Inventor: **Chi Pin Hsu**, Taoyuan (TW)

(73) Assignee: **Chan Machinery Co., Ltd.**, Taoyuan (TW)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 532 days.

(21) Appl. No.: **13/923,546**

(22) Filed: **Jun. 21, 2013**

(65) **Prior Publication Data**

US 2014/0187403 A1 Jul. 3, 2014

(30) **Foreign Application Priority Data**

Dec. 28, 2012 (TW) ..... 101151290 A

(51) **Int. Cl.**
B31B 1/26 (2006.01)
B31B 1/00 (2006.01)

(52) **U.S. Cl.**
CPC . ***B31B 1/26*** (2013.01); ***B31B 1/00*** (2013.01); *B31B 2219/2645* (2013.01); *B31B 2219/29* (2013.01); *B31B 2221/20* (2013.01); *B31B 2221/402* (2013.01)

(58) **Field of Classification Search**
CPC ... B31B 1/26; B31B 1/00; B31B 2219/2645; B31B 2219/29; B31B 1/90; B31B 1/60; B65B 1/02; B65B 7/04
USPC 493/243, 186, 261, 244, 218, 260, 308, 493/184, 432, 453, 242, 245, 73; 53/370.6, 53/371.9, 372.6, 491, 476, 485
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,925,699	A *	2/1960	Ozor	B65B 7/08 53/370.6
6,050,056	A *	4/2000	Weisser	B65B 7/02 493/183
6,971,980	B2 *	12/2005	Chiu Chen	B31B 1/88 493/123
2005/0272584	A1 *	12/2005	Zetterstrom	B31B 1/64 493/175

FOREIGN PATENT DOCUMENTS

CN	201214488 Y	4/2009
CN	201258103 Y	6/2009
CN	201484701 U	5/2010

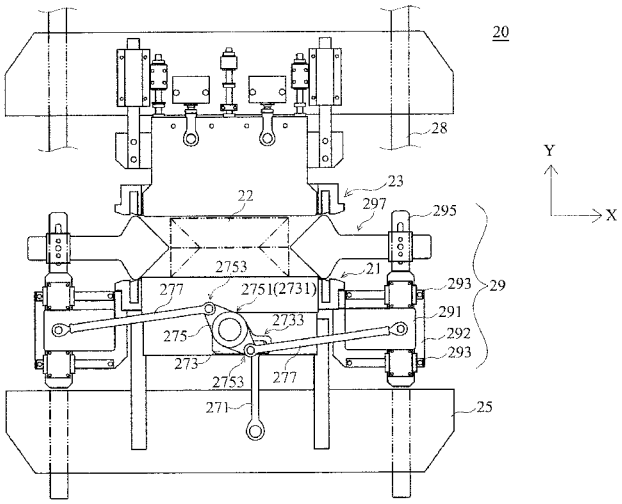
* cited by examiner

Primary Examiner — Hemant M Desai
Assistant Examiner — Mary Hibbert
(74) *Attorney, Agent, or Firm* — Rosenberg, Klein & Lee

(57) **ABSTRACT**

A packaging bag line-folding and sealing machine includes a first sealing unit and a second sealing unit for sealing a packaging bag therebetween, a first rocker arm and a second rocker arm mounted at the first sealing unit, a locating block, a first link coupled between the first rocker arm and the locating block, two line-folding units, and two second links coupled between the second rocker arm and the line-folding units for moving the line-folding units to make folding lines on the packaging bag between the first and second sealing units upon movement of the first sealing unit relative to the locating block. The application of the packaging bag line-folding and sealing machine greatly improves the packaging quality of packaging bags, and allows adjustment of the line-folding units to fit different sizes of packaging bags, enhancing user convenience.

8 Claims, 3 Drawing Sheets



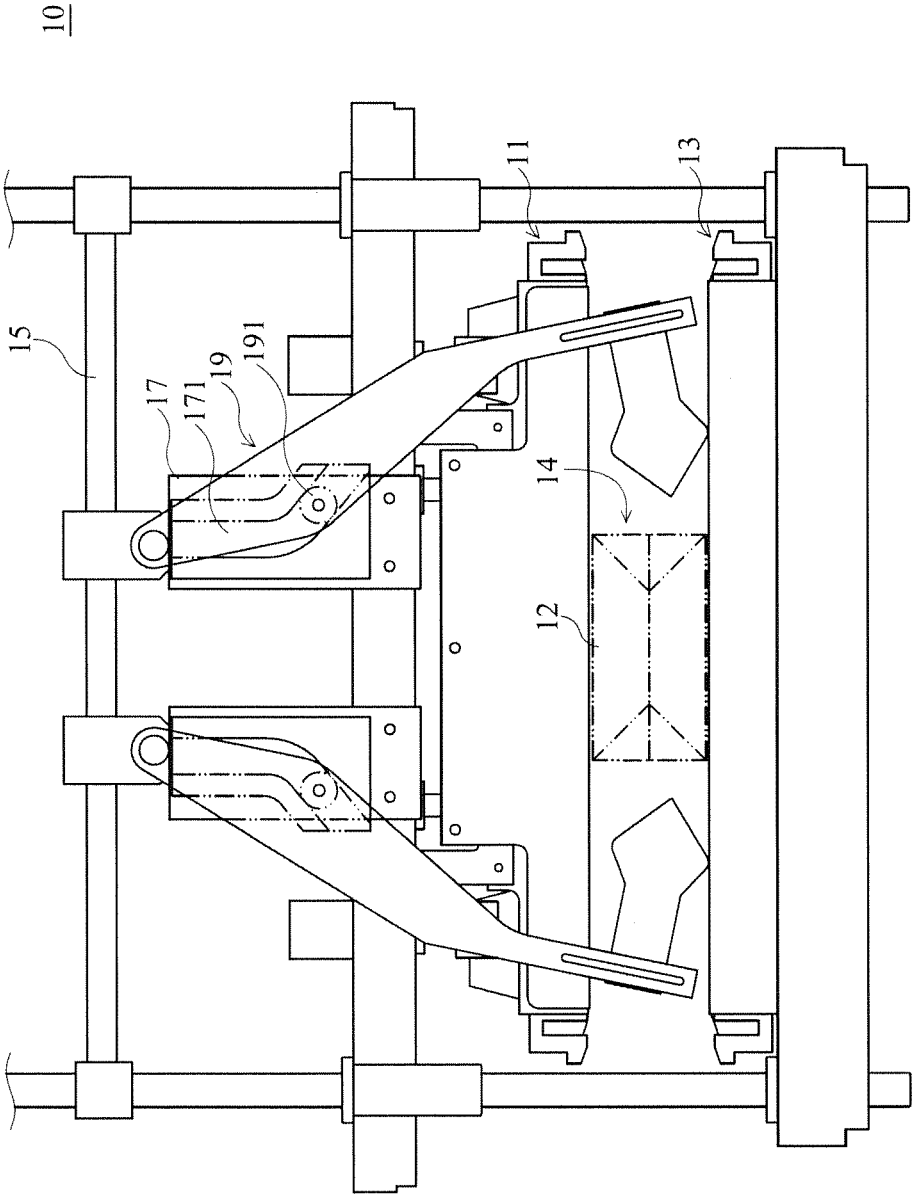


FIG.1
(PRIOR ART)

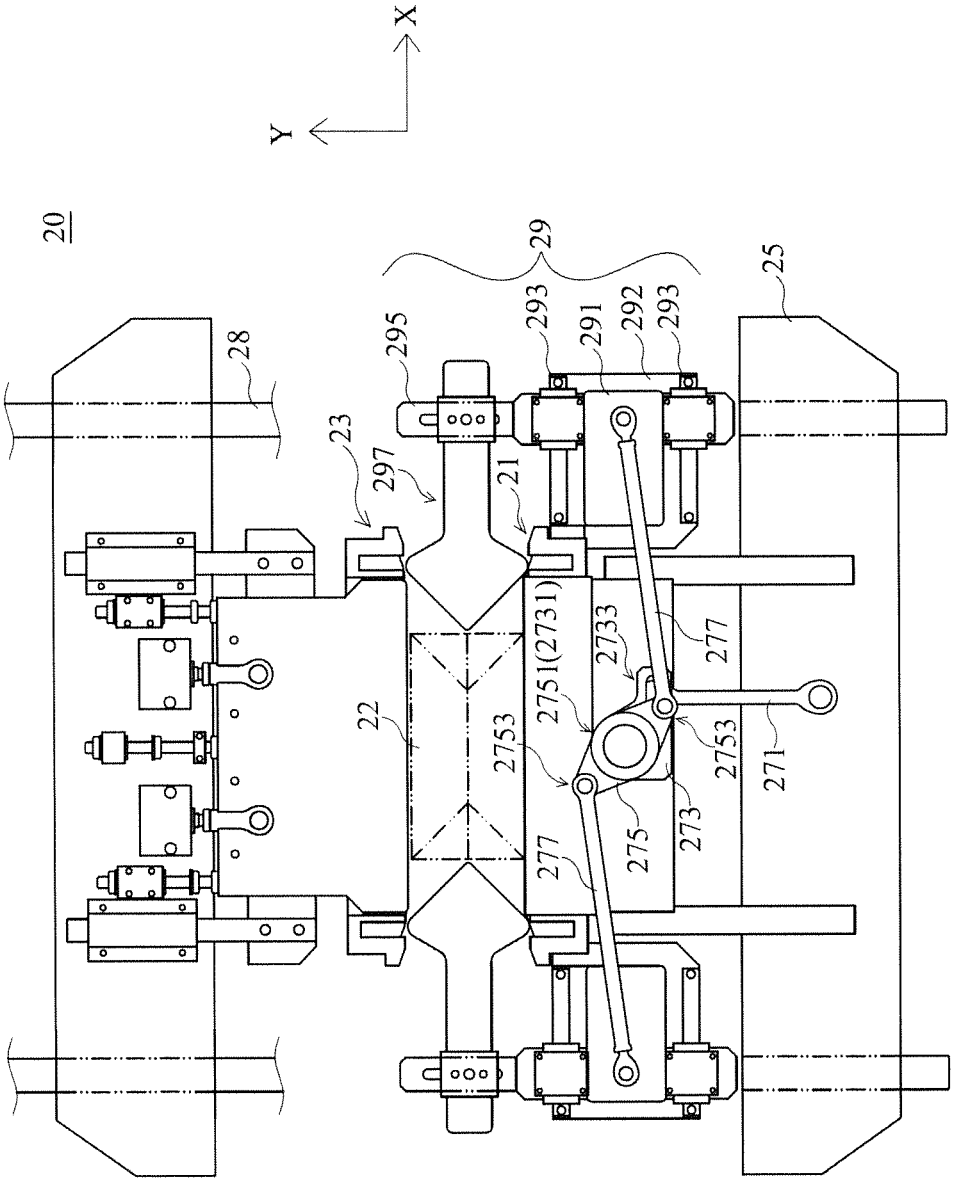

X
Y
20
29
25
28
295
293
291
292
293
23
297
21
22
2753
2751(2731)
2733
277
2753
271
277
275
273

FIG.2

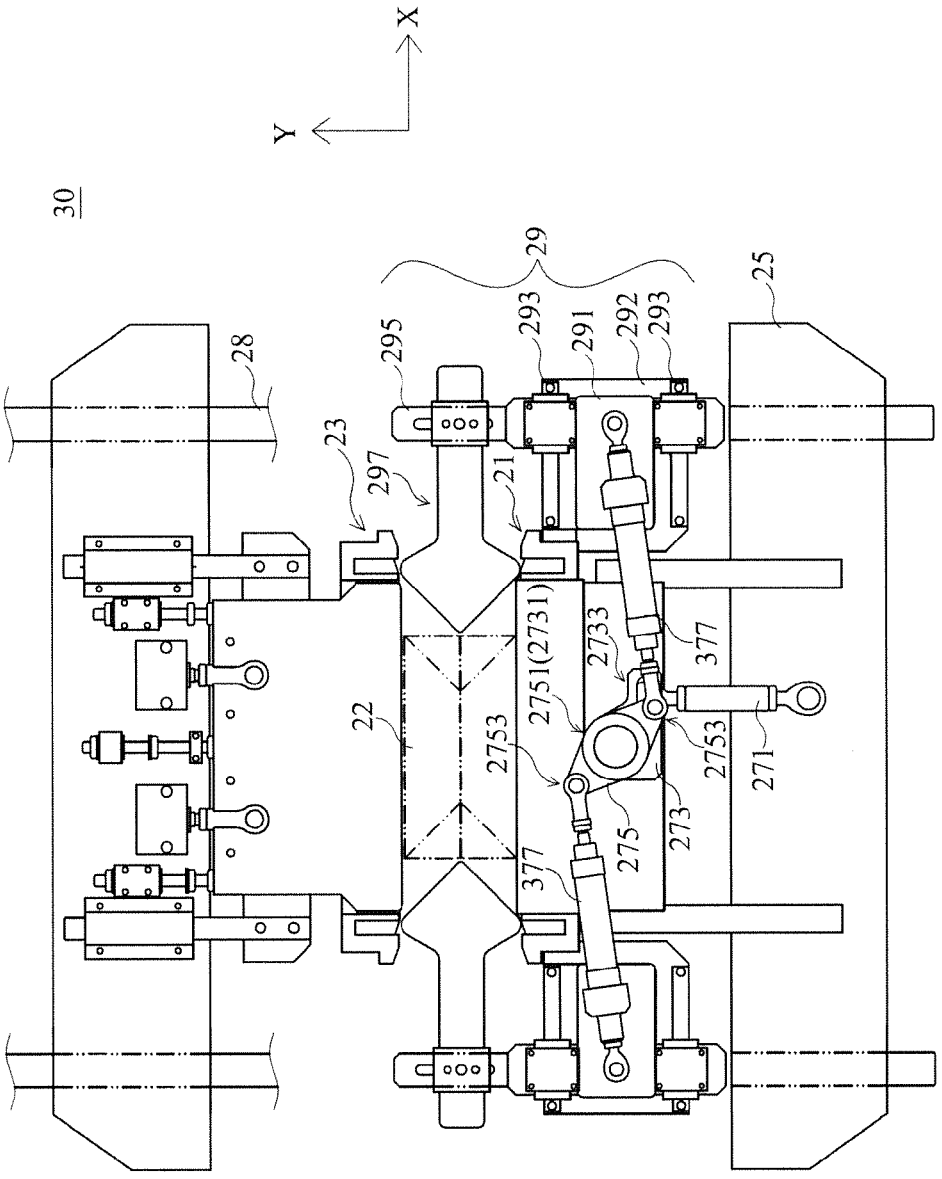

X
Y
30
29
25
28
295
293
291
292
293
23
297
21
22
2733
2751(2731)
377
2753
2753
271
275
273
377

FIG.3

PACKAGING BAG LINE-FOLDING AND SEALING MACHINE

BACKGROUND OF THE INVENTION

1. Technical Field

The present invention relates to bag sealing technology and more particularly, to a packaging bag line-folding and sealing machine, which enhances the sealing yield and prolongs the machine lifespan.

2. Description of the Prior Art

Referring to FIG. **1**, a front view of a conventional packaging bag line-folding and sealing machine is illustrated. As illustrated, the packaging bag line-folding and sealing machine **10** comprises an upper sealing unit **11**, a lower sealing unit **13**, a connection rod **15**, two guide units **17**, and two line-folding units **19**. Moving the upper sealing unit **11** will bias the line-folding unit **19** to fold a packaging bag **12** therebetween the upper sealing unit **11** and the lower sealing unit **13**, and then to seal the packaging bag **12**.

The upper sealing unit **11** and the lower sealing unit **13** are set facing each other, and movable relative to each other to clamp and seal the packaging bag **12**. If the upper sealing unit **11** is moved upwards during actual application, the lower sealing unit **13** will be moved downwards to increase the gap **14** between the upper sealing unit **11** and the lower sealing unit **13** for enabling the packaging bag **12** to be moved through the gap **14** between the upper sealing unit **11** and the lower sealing unit **13**.

After the packaging bag **12** has been delivered to a predetermined position, the upper sealing unit **11** will be moved downwards and the lower sealing unit **13** will be moved upwards, causing the upper sealing unit **11** and the lower sealing unit **13** to clamp and heat the packaging bag **12**, finishing the packaging bag sealing operation. In order to improve the packaging bag **12** sealing quality, the line-folding units **19** are controlled to make a folding line one side, for example, the opposing side panels of the packaging bag **12** prior to the action of driving the upper sealing unit **11** and the lower sealing unit **13** to seal the packaging bag **12**.

The two guide units **17** are coupled to the upper sealing unit **11**, each defining therein a groove **171**. The line-folding units **19** each have one end thereof respectively coupled to the connection rod **15**, and are respectively coupled to the grooves **171** of the guide units **17** by a respective coupling device **191** that is movable along the mating groove **171**. When moving the upper sealing unit **11** relative to the connection rod **15**, the line-folding units **19** are moved along the grooves **171** of the respective guide units **17**, causing the line-folding units **19** to turn about the connection rod **15**.

During movement of the upper sealing unit **11** and the lower sealing unit **13** toward the packaging bag **12**, the line-folding units **19** will be moved toward the opposing side panels of the packaging bag **12** to compress the packaging bag **12**, making a folding line on the packaging bag **12**. Thereafter, the upper sealing unit **11** and the lower sealing unit **13** start sealing the packaging bag **12**.

The aforesaid prior art packaging bag line-folding and sealing machine **10** can make a folding line on a packaging bag **12** and then seal it, however it is still not satisfactory in function. At first, the line-folding units **19** of the packaging bag line-folding and sealing machine **10** are movable by a swinging action. When driving the line-folding units **19** to make a folding line on the packaging bag **12**, the folding line thus made may be not presented in an accurately symmetric condition, affecting the packaging quality of the packaging bag **12**. Further, if the size (width and/or height) of the packaging bag **12** is changed, the operator must adjust the relative positions of the upper sealing unit **11**, the lower sealing unit **13**, the connection rod **15**, the guide units **17** and/or the line-folding units **19**, enabling the line-folding units **19** to make a folding line on the packaging bag **12**. However, because multiple component parts must be adjusted, these component parts will affect one another during adjustment. Thus, this adjustment needs quite a bit of time to finish.

SUMMARY OF THE PRESENT INVENTION

It is, therefore, the main object of the present invention to provide a packaging bag line-folding and sealing machine, which enables the line-folding units thereof to be moved linearly to make symmetrical folding lines on the packaging bag to be sealed, improving the packaging quality of the packaging bag.

It is another object of the present invention to provide a packaging bag line-folding and sealing machine, which allows the operator to adjust the packaging bag line-folding and sealing machine to fit different sizes of packaging bags simply by means of adjusting the position and/or elevation of the line-folding member of each line-folding unit, enhancing application usability and user convenience.

It is still another object of the present invention to provide a packaging bag line-folding and sealing machine, which uses protective members to drive line-folding units, providing better protection to the packaging bag line-folding and sealing machine to reduce the chance of damage to the component parts.

To achieve the above mentioned and other objectives, the present invention provides a packaging bag line-folding and sealing machine, comprising: a first sealing unit; a second sealing unit facing toward the first sealing unit and movable relative to the first sealing unit to seal a packaging bag therebetween; a locating block; a first link coupled to the locating block; a first rocker arm mounted at the first sealing unit and coupled to the first link, the first rocker arm being movable by the first link to swing upon movement of the first sealing unit relative to the locating block; a second rocker arm connected to the first rocker arm and movable by the first rocker arm to swing; two line-folding units respectively coupled to the two second links and movable relative to each other by the second links to fold a packaging bag therebetween upon a swinging action of the second rocker arm.

In one embodiment of the packaging bag line-folding and sealing machine, wherein each the second link is a retractable protective member.

In one embodiment of the packaging bag line-folding and sealing machine, wherein each the line-folding unit comprises at least one connection member, at least one first sliding rail, at least one adjustment member and at least one line-folding member.

In one embodiment of the packaging bag line-folding and sealing machine, wherein the at least one connection member is located at the at least one first sliding rail and connected with the at least one adjustment member and one the second link, and the at least one line-folding member is connected with the at least one adjustment member in such a manner that the at least one line-folding member is movable to fold a packaging bag between the line-folding units upon movement of the at least one connection member along the at least one first sliding rail.

In one embodiment of the packaging bag line-folding and sealing machine, further comprising at least one second

sliding rail adapted to support the first sealing unit, the second sealing unit and the locating block.

In one embodiment of the packaging bag line-folding and sealing machine, wherein each the line-folding unit further comprises a locating member mounted at the second sliding rail to support the at least one first sliding rail.

In one embodiment of the packaging bag line-folding and sealing machine, wherein the at least one first sliding rail and the second sliding rail are kept in a substantially orthogonal manner.

In one embodiment of the packaging bag line-folding and sealing machine, wherein the first sealing unit and the second sealing unit are movable in a first direction, and the line-folding units are movable in a second direction substantially perpendicular to the first direction.

In one embodiment of the packaging bag line-folding and sealing machine, wherein the first rocker arm comprises a fulcrum and a swing portion and the first link is coupled to the swing portion of the first rocker arm.

In one embodiment of the packaging bag line-folding and sealing machine, wherein the second rocker arm comprises a fulcrum connected to the fulcrum of the first rocker arm, and two swing portions respectively coupled to the second links.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic front view of a packaging bag line-folding and sealing machine according to the prior art.

FIG. **2** is a schematic front view of a packaging bag line-folding and sealing machine in accordance with a first embodiment of the present invention.

FIG. **3** is a schematic front view of a packaging bag line-folding and sealing machine in accordance with a second embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. **2**, a front view of a packaging bag line-folding and sealing machine in accordance with a first embodiment of the present invention is illustrated. As illustrated, the packaging bag line-folding and sealing machine **20** comprises a first sealing unit **21**, a second sealing unit **23**, a locating block **25**, a first link **271**, a first rocker arm **273**, a second rocker arm **275**, a plurality of for example, two second links **277**, and two line-folding units **29**.

The first sealing unit **21** and the second sealing unit **23** are set facing each other and movable relative to each other between an open position and a close position. In one embodiment, the first sealing unit **21** is disposed at the bottom side, and the second sealing unit **23** is disposed above the first sealing unit **21**. During working of the packaging bag line-folding and sealing machine **20**, the first sealing unit **21** and the second sealing unit **23** are moved in reversed directions, for example, when moving the first sealing unit **21** upwards, the second sealing unit **23** is moved downwards, and therefore, the first sealing unit **21** and the second sealing unit **23** can clamp a packaging bag **2** therebetween and then seal the packaging bag **2**.

The first rocker arm **273** and the second rocker arm **275** are coupled together and arranged on the first sealing unit **21**. In one embodiment, the first rocker arm **273** comprises a fulcrum **2731** and a swing portion **2733**, and the second rocker arm **275** comprises a fulcrum **2751** and two swing portions **2753**. The fulcrum **2731** of the first rocker arm **273** is connected to the fulcrum **2751** of the second rocker arm **275**. Thus, forcing the first rocker arm **273** to swing will drive the second rocker arm **275** to swing. In one embodiment, the fulcrum **2731** of the first rocker arm **273** and the fulcrum **2751** of the second rocker arm **275** are coincided with each other and coupled to the first sealing unit **21**, allowing the first rocker arm **273** and the second rocker arm **275** to be oscillated back and forth relative to the first sealing unit **21**.

The locating block **25** is disposed adjacent to the first sealing unit **21**, and coupled to the first rocker arm **273** at the first sealing unit **21** by the first link **271**, for example, coupled to the swing portion **2733** of the first rocker arm **273** by the first link **271**. When operating the packaging bag line-folding and sealing machine **20** to seal a packaging bag **22**, the locating block **25** is kept immovable, and the first sealing unit **21** is movable relative to the locating block **25**. During movement of the first sealing unit **21** relative to the locating block **25**, the first link **271** at the locating block **25** will carry the first rocker arm **273** to swing, causing the second rocker arm **275** to swing.

The two swing portions **2753** of the second rocker arm **275** are respectively coupled to respective one ends of the second links **277**. The respective other ends of the second links **277** are respectively coupled to the line-folding units **29**. During swinging of the second rocker arm **275** about the axis extending through its fulcrum **2751**, the two second links **277** will move the line-folding units **29** in reversed directions to compress the packaging bag **22**.

In one embodiment, the first sealing unit **21** and the second sealing unit **23** are movable in a first direction Y, the two line-folding units **29** are movable in a second direction X substantially perpendicular to the first direction Y. Further, when moving the first sealing unit **21** and the second sealing unit **23** toward the packaging bag **22**, the two line-folding units **29** will also be moved toward the packaging bag **22**.

In actual application, the two line-folding units **29** are disposed at opposing left and right sides relative to the packaging bag **22** to be sealed, and moved toward the opposing side panels of the packaging bag **22**. After the line-folding units **29** touched the packaging bag **22**, the two opposing side panels of the packaging bag **22** are folded inwards. The first sealing unit **21** and the second sealing unit **23** are respectively disposed at opposing top and bottom sides relative to the packaging bag **22** to be sealed, and moved toward the packaging bag **22** to clamp and seal the laterally inwardly folded packaging bag **22**.

The packaging bag line-folding and sealing machine **20** is characterized by the relative motion between the first sealing unit **21** and the locating block **25** to move the first link **271**, the first rocker arm **273**, the second rocker arm **275** and the second links **277**, driving the line-folding unit **29** to make folding lines on the packaging bag **22**. By means of adjusting the relative positions or lengths among the locating block **25**, the first sealing unit **21**, the first link **271**, the first rocker arm **273**, the second rocker arm **275**, the second links **277** and/or the line-folding units **29**, the line-folding units **29** can make folding lines on the packaging bag **22** at a selected location. Further, the first sealing unit **21** and the second sealing unit **23** will seal the packaging bag **22** only after the line-folding units **29** have make folding lines on the packaging bag **22** at the selected location.

In one embodiment, each line-folding unit **29** comprises a connection member **291**, at least one first sliding rail **293**, at least one adjustment member **295** and at least one line-folding member **297**. The connection member **291** is located at the first sliding rail **293**, and connected to one respective second link **277**. The adjustment member **295** is located at

the connection member **291**, and connected to the line-folding member **297**. During the operation to make folding lines on the packaging bag **22**, the respective second link **277** will move the connection member **291** along the first sliding rail **293**, causing the line-folding member **297** to fold the respective side panel of the packaging bag **22** to be sealed. During an adjustment operation, the line-folding member **297** can be moved along the adjustment member **295** to the desired position, enabling the line-folding member **297** to make a folding line on the packaging bag **22** at a predetermined location.

Because each second link **277** has its one end coupled to the second rocker arm **275** and its other end coupled to the connection member **291**, swinging the second rocker arm **275** can drive the second links **277** to move the connection members **291** of the line-folding units **29** along the respective first sliding rails **293**, causing the respective line-folding members **297** to move in the second direction X and to make folding lines on the packaging bag **22**.

Unlike the swinging action of the line-folding units **19** of the prior art packaging bag line-folding and sealing machine **10**, the line-folding units **29** of the packaging bag line-folding and sealing machine **20** of the present invention are linearly movable in the second direction (for example, horizontal direction) X to make symmetrical (top and bottom) folding lines on the packaging bag **22**, improving the packaging quality of the packaging bag **22**.

When using the packaging bag line-folding and sealing machine **20** to seal packaging bags **22** of a different size, the operator can fix the relative positions of the first sealing unit **21**, the locating block **25**, the first link **271**, the first rocker arm **273**, the second rocker arm **275** and the second links **277**, and then adjust the elevation of the second sealing unit **23** and the position of the line-folding units **29**, for example, the elevations and lengths of the line-folding members **297** of the line-folding units **29**. Thus, the packaging bag line-folding and sealing machine **20** is applicable to seal packaging bags **22** with different sizes. When compared to the prior art packaging bag line-folding and sealing machine **10**, the adjustment of the packaging bag line-folding and sealing machine **20** of the present invention is much easy, shortening the time the operator required to calibrate the packaging bag line-folding and sealing machine **20**.

In one embodiment, the line-folding and sealing machine **20** further comprises at least one second sliding rail **28** adapted to support the first sealing unit **21**, the second sealing unit **23** and/or the locating block **25**, facilitating adjustment of relative positions among the first sealing unit **21**, the second sealing unit **23** and/or the locating block **25** for enabling the packaging bag line-folding and sealing machine **20** to fold and seal different sizes of packaging bags **22**.

In one embodiment, each line-folding unit **29** further comprises a locating member **292** mounted on one respective second sliding rail **28** to support the associate first sliding rail **293** in a substantially orthogonal manner.

When adjusting the packaging bag line-folding and sealing machine **20**, the position of the first sealing unit **21** and/or the position of the locating block **25** are normally remained unchanged, the operator simply needs to lift or lower the second sealing unit **23**, allowing the packaging bag **22** to be delivered through the gap between the first sealing unit **21** and the second sealing unit **23** and the first sealing unit **21** and the second sealing unit **23** to clamp and seal the packaging bag **22**. Thereafter, adjust the line-folding units **29** to move the line-folding members **297** to the position about one half of the height of the packaging bag **22** where the line-folding members **297** can fold the packaging bag **22** to make symmetrical folding lines on the packaging bag **22**.

The second links **277** of the packaging bag line-folding and sealing machine **20** in accordance with the first embodiment of the present invention as illustrated in FIG. **2** can be substituted by respective protective members. In a second embodiment of the present invention, as illustrated in FIG. **3**, protective members **377** are used in the packaging bag line-folding and sealing machine **30** and coupled between the second rocker arm **275** and the line-folding units **29**. The second rocker arm **275** can move the line-folding units **29** by means of the respective protective members **377**.

In this second embodiment, the protective members **377** are protective air cylinders. If the external pressure applied to the opposite ends of the protective members **377** surpasses the protective pressure of the protective air cylinders, the protective members **377** will be forced to retract or expand. If the external pressure applied to the opposite ends of the protective members **377** is within the range of the protective pressure of the protective air cylinders, the protective members **377** will not be forced to retract or expand, and will work like the second links **277**, allowing the second rocker arm **275** to move the line-folding units **29** through the protective members **377**.

The arrangement of the protective members **377** can protect the component parts of the packaging bag line-folding and sealing machine **30** against damage. For example, if an internal component part of the packaging bag line-folding and sealing machine **30** is stuck, the protective members **377** can be forced by the applied external force to expand or retract, avoiding transmission of the applied external force to other component parts, lowering the risk of component damage.

Although particular embodiments of the invention have been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited except as by the appended claims.

What is claimed is:

1. A packaging bag line-folding and sealing machine, comprising:

a first sealing unit;

a second sealing unit facing toward said first sealing unit and movable relative to said first sealing unit to seal a packaging bag therebetween;

a locating block;

a first link coupled to said locating block;

a first rocker arm mounted at said first sealing unit and coupled to said first link, said first rocker arm being movable by said first link to swing upon movement of said first sealing unit relative to said locating block;

a second rocker arm connected to said first rocker arm and movable by said first rocker arm to swing;

two second links respectively coupled to said second rocker arm; and

two line-folding units respectively coupled to said two second links and movable relative to each other by said second links to fold a packaging bag therebetween upon a swinging action of said second rocker arm;

wherein each said line-folding unit comprises at least one connection member, at least one first sliding rail, at least one adjustment member and at least one line-folding member; and

wherein said at least one connection member is located at said at least one first sliding rail and connected with said at least one adjustment member and one said

second link, and said at least one line-folding member is connected with said at least one adjustment member in such a manner that said at least one line-folding member is movable to fold a packaging bag between said line-folding units upon movement of said at least one connection member along said at least one first sliding rail.

2. The packaging bag line-folding and sealing machine as claimed in claim **1**, wherein each said second link is a retractable protective member.

3. The packaging bag line-folding and sealing machine as claimed in claim **1**, further comprising at least one second sliding rail adapted to support said first sealing unit, said second sealing unit and said locating block.

4. The packaging bag line-folding and sealing machine as claimed in claim **3**, wherein each said line-folding unit further comprises a locating member mounted at said second sliding rail to support said at least one first sliding rail.

5. The packaging bag line-folding and sealing machine as claimed in claim **3**, wherein said at least one first sliding rail and said second sliding rail are kept in a substantially orthogonal manner.

6. The packaging bag line-folding and sealing machine as claimed in claim **1**, wherein said first sealing unit and said second sealing unit are movable in a first direction, and said line-folding units are movable in a second direction substantially perpendicular to said first direction.

7. The packaging bag line-folding and sealing machine as claimed in claim **1**, wherein said first rocker arm comprises a fulcrum and a swing portion and said first link is coupled to the swing portion of said first rocker arm.

8. The packaging bag line-folding and sealing machine as claimed in claim **7**, wherein said second rocker arm comprises a fulcrum connected to the fulcrum of said first rocker arm, and two swing portions respectively coupled to said second links.

* * * * *